CONTENTS OF VOLUME 49

Abudefduf abdominalis: colonial nesting 949
Achaearanea wau: division of labour in 1315
Acharya, L. Sex-biased predation on moths by insectivorous bats 1461
Acinonyx jubatus: play of 333
Acrocephalus arundinaceus: cuckoo egg discrimination 1185
Acrocephalus sechellensis: breeding and reproduction 695
Acrosternum hilare: preference for large mates 1335
ADAMO, S. A. & HOY, R. R. Agonistic behaviour in male and female field crickets *Gryllus bimaculatus* and how behavioural context influences its expression 1491
Adoption
  in ring-billed gulls 321
  white storks 1097
Advertisement call evolution: toads and chorus frogs 283
African painted reed frog, *Hyperolius marmoratus*: mate choice 181
Agelaius phoeniceus
  paternity and paternal behaviour 21
  reproductive success 967
Agelenopsis aperta: mate choice in 715
Agonistic behaviour, field crickets 1491
Alarm calls
  eastern chipmunks 81
  willow tits 221
ALATALO, R. V.
  see HÖGLUND, J.
  see RINTAMÄKI, P. T.
Allonursing in river buffalo 1611
Alloparental care, white storks 1097
ALONSO, J. A., *see* ALONSO, J. C.
ALONSO, J. C., ALONSO, J. A., BAUTISTA, L. M. & MUÑOZ-PULIDO, R. Patch use in cranes: a field test of optimal foraging predictions 1367
ALONSO-MEJIA, A., *see* ROWELL-RAHIER, M.
Alpine accentor, *Prunella collaris*: polygynandrous mating system 769
Ammospermophilus leucurus: shuttling 107
ANDERSON, J. R., SALLABERRY, P. & BARBIER, H. Use of experimenter-given cues during object-choice tasks by capuchin monkeys 201
ANDERSON, P., *see* BAKER, M. C.
Androgens and territoriality of male lizards 661
Animal societies, sexual coercion in 1345
Anolis aeneus: territorial acquisition 679
Anolis sagrei: male territorial acquisition 661
Antelope, *Kobus leche kafuensis*: lek-breeding 419
ANTOLIN, M. F., ODE, P. J. & STRAND, M. R. Variable sex ratios and ovicide in an outbreeding parasitic wasp 589
ANTOLIN, M. F., *see* ODE, P.
Ants
  desert seed harvester, *Messor pergandei*: joint nesting 567
  fire, *Solenopsis invicta*: sex ratios in 749
  Pogonomyrmex barbatus: foraging range 649
Apis mellifera
  corpse removal 159
  landmarks 159
Apotematic coloration in prey of garter snakes 857
APPLEBY, M. C., *see* GRIGOR, P. N.
ARON, S., VARGO, E. L. & PASSERA, L. Primary and secondary sex ratios in monogyne colonies of the fire ant 749
ARTISS, T. & MARTIN, K. Male vigilance in white-tailed ptarmigan, *Lagopus leucurus*: mate guarding or predator detection? 1249
ATKINS, K., *see* KENDRICK, K. M.
Atlantic salmon *Salmo salar*: social status 431
Attack priming, Syrian golden hamsters 931
Aves: Psophiidae, dominance status and mating strategies 725
BACKWELL, P. R. Y., *see* JENNIONS, M. D.
BAKER, M. C. & ANDERSON, P. Once-pilfered cache sites not avoided by black-capped chickadees .. 1598

BARBIER, H., *see* ANDERSON, J. R.
Barn swallows, *Hirundo rustica*: mate guarding by 465
BARNEA, A. & NOTTEBOHM, F. Patterns of food storing by black-capped chickadees suggest a mnemonic hypothesis 1161
BARRETT, L., DUNBAR, R. I. M. & DUNBAR, P. Mother-infant contact as contingent behaviour in gelada baboons.. 805
Bats, *Lasiurus*: sex-biased predation on moths 1461
BAUTISTA, L. M., *see* ALONSO, J. C.
BEANI, L. & DESSÌ-FULGHERI, F. Mate choice in the grey partridge, *Perdix perdix*: role of physical and behavioural male traits 347
BECK, M. W., *see* POLLARD, S. D.
BECK, W., *see* WEINDLER, P.
Beetles
leaf, *Oreina* spp.: unpalatability of 709
Begging and hunger in pigeons 601
Behaviour
agonistic, field crickets 1491
locally adaptive 1325
Bighorn sheep, *Ovis canadensis*: mother–yearling association 901
Birds: reproductive timing 1569
BIRKHEAD, T. R. & FLETCHER, F. Depletion determines sperm numbers in male zebra finches .. 51
Black grouse, *Tetrao tetrix*: mate-choice copying in 1627
Black vultures, *Coragyps atratus*: communally roosting 395
Black-capped chickadees, *Parus atricapillus*
food cache sites 1598
food storing by 989
mnemonic hypothesis on 1161
Blue tits, *Parus caeruleus*: polygyny in 1047
BOAKE, C. R. B. & HOIKKALA, A. Courtship behaviour and mating success of wild-caught *Drosophilia silvestris* males 1303
Body size and territorial success in fruit flies 671
BOLYARD, K. J., *see* ROWLAND, W. J.
Bombus occidentalis: learning by 1481
BORGIA, G. Complex male display and female choice in the spotted bowerbird: specialized functions for different bower decorations 1291
Bos taurus: non-nutritive sucking 1503
Bowerbird, *Chlamydera maculata*: spotted, male display and female choice 1291
Bracon hebetor Say
brood-mate avoidance in 1239
ovicide in 589
Breeding
in leks in Kafue lechwe antelope 419
of Seychelles warblers 695
BROAD, K. D., *see* KENDRICK, K. M.
BROCKMANN, H. J., *see* PENN, D.
Brood-mate avoidance in parasitic wasps 1239
BROWER, L. P., *see* ROWELL-RAHIER, M.
BROWN, K. M., WOULFE, M. & MORRIS, R. D. Patterns of adoption in ring-billed gulls: who is really winning the inter-generational conflict? 321
BRYANT, D. M., *see* RILEY, H. T.
BRYANT, M. J. & GRANT, J. W. A. Resource defence, monopolization and variation of fitness in groups of female Japanese medaka depend on the synchrony of food arrival 1469
BRYANT, M. J., *see* GRANT, J. W. A.
Bubalus bubalis: allonursing in 1611
Bufo spp.: call evolution 283
Bufo valliceps: sexual selection 305
Bumblebees, *Bombus occidentalis*: learning 1481
BURGHARDT, G. M., *see* TERRICK, T. D.
BURKE, T., *see* HARTLEY, I. R.
Butterflies, *Pieris*: male choice in 45
Caddis larvae, *Silo pallipes*: cases of 473
CADE, W. H., *see* WAGNER, W. E., Jr
Cage cleaning by mice 821

CONTENTS

California gull, *Larus californicus*: offspring growth in 641
Call analysis of túngara frog 911
Calves, *Bos taurus*: non-nutritive sucking 1503
Canaries, *Serinus canaria*: song phrases, responsiveness to 1603
CAPONE, T. A. Mutual preference for large mates in green stink bugs, *Acrosternum hilare* (Hemiptera: Pentatomidae) 1335
Capuchins
Cebus apella
behaviour with novel food 1089
object-choice tasks by 201
white-faced, *Cebus capuchinus*: vigilance in 63
CARLSON, A. A., *see* CONVERSE, L. J.
CARO, T. M. Short-term costs and correlates of play in cheetahs 333
CARRANZA, J., *see* MATEOS, C.
CARTER, R. E., *see* RILEY, H. T.
CASTLE, G., *see* KOMDEUR, J.
Cebuella pygmaea: communication of ovulatory state 615
Cebus apella
behaviour of with novel food 1089
object-choice tests 201
Cebus capucinus: vigilance in 63
Cheetahs, *Acinonyx jubatus*: play in 333
Chemosensory perception in mole rats 1009
Chicks, *Gallus gallus domesticus*: detour problems 195
Chimpanzee, *Pan troglodytes scheinfurthii*: predation by 577
Chipmunks, eastern, *Tamias striatus*: alarm calls 81
CHITTKA, L. & GEIGER, K. Can honey bees count landmarks? 159
Chlamydera maculata: male display 1291
CHOE, J. C. Courtship feeding and repeated mating in *Zorotypus barberi* (Insecta: Zoraptera) .. 1511
Cichlasoma nigrofasciatum
defence of broods 1171
parental food provisioning 623
Cichlid, convict, *Cichlasoma nigrofasciatum*
defensive of broods 1171
food provisioning 623
Ciconia ciconia: nest switching 1097
CLARK, C. W., *see* DUKAS, R.
CLUTTON-BROCK, T. H. & PARKER, G. A. Sexual coercion in animal societies 1345
COCKBURN, A., *see* COONEY, R.
COCROFT, R. B. & RYAN, M. J. Patterns of advertisement call evolution in toads and chorus frogs .. 283
Coenagrion scitulum: repeated insemination and sperm competition 437
Coenagrionidae: repeated insemination and sperm competition 437
Collared flycatcher, *Ficedula albicollis*: philopatry in 1029
COLLINS, S. A. The effect of recent experience on female choice in zebra finches 479
Colobus badius tephrosceles: anti-predator behaviour 577
Colonial nesting in coral-reef fish 949
Colour
bands in willow ptarmigan 53
cues and mate choice in three-spined stickleback 1559
in prey of garter snakes 857
Columba livia: feeding in 601
Combs, in willow ptarmigan 53
Concorde fallacy in willow tit 1017
CONNOR, R. C. & CURRY, R. L. Helping non-relatives: a role for deceit? 389
Conventional signals 1689
CONVERSE, L. J., CARLSON, A. A., ZIEGLER, T. E. & SNOWDON, C. T. Communication of ovulatory state to mates by female pygmy marmosets, *Cebuella pygmaea* 615
Convict cichlid, *Cichlasoma nigrofasciatum*
defensive of broods 1171
parental food provisioning 623
COOMBES, K., *see* POTEGAL, M.
COONEY, R. & COCKBURN, A. Territorial defence is the major function of female song in the superb fairy-wren, *Malurus cyaneus* 1635

Cooperation in male lions 95
Copulation
great snipe 209
white-winged trumpeters 725
Coragyps atratus: roosting 395
Coral-reef fish, *Abudefduf abdominalis*: colonial nesting in 949
CORDERO, A., SANTOLAMAZZA-CARBONE, S. & UTZERI, C. Male disturbance, repeated insemination and sperm competition in the damselfly *Coenagrion scitulum* (Zygoptera: Coenagrionidae) .. 437
Corn bunting, *Miliaria calandra*: polygyny in 1111
Corpse removal in honey bees colonies 867
Costa Rica: white-faced capuchins in 63
Cottus gobio: and caddis larvae cases 473
Counter marking, in golden hamsters 1435
Courtship
feeding, and repeated mating 1511
fruit flies 1303
Coverable badges in willow ptarmigan 53
Cowbirds, *Molothrus ater*
burial of eggs yellow warblers 877
DNA fingerprinting 1577
Crab spiders, *Misumenoides formosipes*: drinking nectar 1443
Cranes, *Grus grus*: patch use in foraging 1367
Crickets, field, *Gryllus bimaculatus*
agonistic behaviour 1491
mating preferences 1269
CRILL W. D., *see* ZAMUDIO, K. R.
Crowing and status in roosters 1283
Cryptocotyle spp.: parasite on pipefish 1039
Cuckoos, *Cuculus canorus*: egg discrimination of 1185
Cuculus canorus: eggs, acceptance or rejection of 1185
CURRY, R. L., *see* CONNOR, R. C.
DAHN-HURNI, C., *see* ETIENNE, A. S.
D'AMATO, F. R., *see* SCHINO, G.
Damselfly, *Coenagrion scitulum*: insemination and sperm competition 437
DAVIES, N. B., HARTLEY, I. R., HATCHWELL, B. J., DESROCHERS, A., SKEER, J. & NEBEL, D. The polygynandrous mating system of the alpine accentor, *Prunella collaris*. I. Ecological causes and reproductive conflicts 769
DAVIES, N. B., *see* HARTLEY, I. R.
DAWKINS, M. S., *see* GUILFORD, T.
DE FANIS, E. & JONES, G. The role of odour in the discrimination of conspecifics by pipistrelle bats .. 835
DE PASSILLÉ, A. M., *see* RUSHEN, J.
DE REYNA, L. A., *see* REDONDO, T.
DE SOUZA, R. C., *see* MURPHEY, R. M.
DECKER, M. D., *see* PARKER, P. G.
Delichon urbica: extra-pair fertilizations and paternity defence 495
Dendroica petechia: cowbird egg burial 877
Desert antelope ground squirrels, *Ammospermophilus leucurus*: shuttling 107
Desert seed harvester ants, *Messor pergandei*: joint nesting 567
DESROCHERS, A.
see DAVIES, N. B.
see HARTLEY, I. R.
DESSI-FULGHERI, F., *see* BEANI, L.
Detour problems in chicks 195
DEWSBURY, D. A. Americans in Europe: the role of travel in the spread of European ethology after World War II 1649
DHONDT, A. A., *see* WAUTERS, L. A.
Dipodomys spectabilis: footdrumming signatures 1227
Displays, rewarded, three-spined sticklebacks 137
Division of labour, in social spider 1315
DNA fingerprinting of brown-headed cowbirds 1577
DODSON, G. N., *see* POLLARD, S. D.
Dominance status, white-winged trumpeters 725
Drosophila melanogaster: male territorial success in 671

CONTENTS

Drosophila silvestris: courtship behaviour 1303
DRUMMOND, H. & MACÍAS GARCIA, C. Congenital responsiveness of garter snakes to a dangerous prey abolished by learning 891
DUGATKIN, L. A., *see* GODIN, J.-G. J.
DUKAS, R. & CLARK, C. W. Sustained vigilance and animal performance 1259
DUKAS, R. Transfer and interference in bumblebee learning 1481
DUNBAR, P., *see* BARRETT, L.
DUNBAR, R. I. M., *see* BARRETT, L.
DUNCAN, I. J. H., *see* PETHERICK, J. C.
Dustbathing behaviour in domestic fowl 1521
EASON, P., *see* HANNON, S. J.
EASON, P. K. & SHERMAN, P. T. Dominance status, mating strategies and copulation success in cooperatively polyandrous white-winged trumpeters, *Psophia leucoptera* (Aves: Psophiidae) 725
Eggs, cuckoo, discrimination of 1185
Erpobdella punctata: as prey of garter snakes 891
Ethology: American and European 1649
ETIENNE, A. S., JORIS-LAMBERT, S., DAHN-HURNI, C. & REVERDIN, B. Optimizing visual landmarks: two- and three-dimensional minimal landscapes 165
Eucoilidae: oviposition decisions 1677
Extended song learning in wild European starlings 357
Extra-pair fertilizations in house martins 495
FABRE-NYS, C., *see* KENDRICK, K. M.
Facial discrimination in sheep 1665
FEDIGAN, L. M., *see* ROSE, L. M.
Females
  attack priming, Syrian golden hamsters 931
  mate choice
    black grouse leks 759
    of Gulf Coast toad 305
    in ring-necked pheasants 737
    spotted bowerbird 1291
  mate sampling and copulation behaviour 209
  mating preference in guppy 1427
  melanin pattern in butterflies 45
  mountain goats, social dominance in 1449
  red junglefowl
    mate choice by 117
    multiple mates 127
  red squirrels, territoriality 187
  reproductive success, red-winged blackbirds 967
  song, superb fairy-wren 1635
FERKIN, M. H. & JOHNSTON, R. E. Effects of pregnancy lactation and postpartum oestrus on odour signals and the attraction to odours in female meadow voles, *Microtus pennsylvanicus* 1211
FERKIN, M. H. & JOHNSTON, R. E. Meadow voles, *Microtus pennsylvanicus*, use multiple sources of scent for sex recognition 37
FESTA-BIANCHET, M.
  see FOURNIER, F.
  see L'HEUREUX, N.
Ficedula albicollis: philopatry of 1029
Field crickets
  Gryllus bimaculatus: agonistic behaviour 1491
  Gryllus integer: mating preferences 1269
Fire ants, *Solenopsis invicta*: sex ratios in 749
Fish, foraging behaviour 411
FISKE, P. & KALAS, J. A. Mate sampling and copulation behaviour of great snipe females .. 209
FLEISCHER, R. C., *see* HAHN, D. C.
FLETCHER, F., *see* BIRKHEAD, T. R.
Food
  arrival, Japanese medaka 1469
  cache sites of black-capped chickadees 1598
  distribution, and fish foraging behaviour 411

novel, capuchin monkeys with 1089
rats' choice of 403
storing by black-capped chickadees
patterns 1161
season and photoperiod on 989
Footdrumming signatures, kangaroo rats 1227
Foraging
ants' range 649
cranes, patch use in 1367
fish, behaviour of 411
long-tailed macaques 457
male salamanders 633
and oviposition decisions 1677
of starlings 1617
FOURNIER, F. & FESTA-BIANCHET, M. Social dominance in adult female mountain goats 1449
Fowl, domestic, *Gallus gallus domesticus*
dustbathing behaviour 1521
inhibition of movement 1381
FOWLER, J., *see* ROWLAND, W. J.
FRAGASZY, D., *see* VISALBERGHI, E.
Free distribution models, resource dynamics in 487
Frogs, *Bufo* spp.: advertisement call evolution 283
Fruit flies
Drosophila melanogaster: body size and territorial success 671
Drosophila silvestris: courtship behaviour and mating success 1303
GABOR, C. R. & JAEGER, R. G. Resource quality affects the agonistic behaviour of territorial salamanders 71
GALEF, B. G., Jr. Why behaviour patterns that animals learn socially are locally adaptive .. 1325
GALEF, B. G., Jr & WRIGHT, T. J. Groups of naive rats learn to select nutritionally adequate foods faster than do isolated naive rats 403
Gallinago media: mate sampling 209
Gallinula chloropus: parasitism in 1073
Gallus gallus
mate choice in 117
multiple mates 127
Gallus gallus domesticus
crowing and status 1283
detour problems 195
dustbathing behaviour 1521
movement inhibited 1381
Garter snakes, prey of 857
dangerous, discrimination of 891
Gasterosteus aculeatus
displays 137
male colour cues 1559
GEIGER, K., *see* CHITTKA, L.
Gelada baboons, *Theropithecus gelada*: mother–infant contact in 805
GIBSON, R. M., *see* HÖGLUND, J.
GIRALDEAU, L.-A., *see* TEMPLETON, J. J.
GODIN, J.-G. J. & DUGATKIN, L. A. Variability and repeatability of female mating preference in the guppy 1427
Golden hamsters, *Mesocricetus auratus*
landmarks 165
scent marks 1435
Syrian, attack priming 931
GOMES DA SILVA, R., *see* MURPHEY, R. M.
GORDON, D. M. The development of an ant colony's foraging range 649
GRANT, J. W. A., BRYANT, M. J. & SOOS, C. E. Operational sex ratio, mediated by synchrony of female arrival, alters the variance of male mating success in Japanese medaka 367
GRANT, J. W. A., *see* BRYANT, M. J.
GRAY, S. & HURST, J. L. The effects of cage cleaning on aggression within groups of male laboratory mice 821
Great snipe, *Gallinago media*: females, mate sampling 209

CONTENTS

Green stink bugs, *Acrosternum hilare*: large mates, preference for 1335
Grey partridge, *Perdix perdix*: mate choice in 347
GRIGOR, P. N., HUGHES, B. O. & APPLEBY, M. C. Social inhibition of movement in domestic hens.. 1381
GRINNELL, J., PACKER, C. & PUSEY, A. E. Cooperation in male lions: kinship, reciprocity or mutualism? 95
Group-size effect and predation, vigilance for 11
GRUBB, T. C., Jr, *see* MAUCK, R. A.
Grus grus: foraging 1367
Gryllus bimaculatus: agonistic behaviour in 1491
Gryllus integer: mating preferences 1269
GUILFORD, T. & DAWKINS, M. S. What are conventional signals? 1689
Gulf Coast toad, *Bufo valliceps*: sexual selection in 305
Gull, California, *Larus californicus*: offspring growth in 641
Guppy, *Poecilia reticulata*
  mating preference 1427
  offspring quality 377
  Trinidadian, sexual behaviour of 1139
Haementeria officinalis: as prey of garter snakes 891
HAHN, D. C. & FLEISCHER, R. C. DNA fingerprint similarity between female and juvenile brown-headed cowbirds trapped together.. 1577
HAINSWORTH, R. Optimal body temperatures with shuttling: desert antelope ground squirrels .. 107
HAMPTON, R. R., *see* SHETTLEWORTH, S. J.
HANNON, S. J. & EASON, P. Colour bands, combs and coverable badges in willow ptarmigan .. 53
HARTLEY, I. R. & SHEPHERD, M. A random female settlement model can explain polygyny in the corn bunting 1111
HARTLEY, I. R., DAVIES, N. B., HATCHWELL, B. J., DESROCHERS, A., NEBEL, D. & BURKE, T. The polygynandrous mating system of the alpine accentor, *Prunella collaris*. II. Multiple paternity and parental effort 789
HARTLEY, I. R., *see* DAVIES, N. B.
HATCHWELL, B. J.
  see DAVIES, N. B.
  see HARTLEY, I. R.
Hemiptera: Pentatomidae: large mates 1335
HEMMI, J. M. & MENZEL, C. R. Foraging strategies of long-tailed macaques, *Macaca fascicularis*: directional extrapolation 457
HETH, G. & TODRANK, J. Assessing chemosensory perception in subterranean mole rats: different responses to smelling versus touching odorous stimuli 1009
HINTON, M. R., *see* KENDRICK, K. M.
Hirundo rustica: mate guarding 465
HÖGLUND, J., ALATALO, R. V., GIBSON, R. M. & LUNDBERG, A. Mate-choice copying in black grouse.. 1627
HÖGLUND, J., *see* RINTAMÄKI, P. T.
HOGSTAD, O. Alarm calling by willow tits, *Parus montanus*, as mate investment 221
HOIKKALA, A., *see* BOAKE, C. R. B.
Honey bees, *Apis mellifera*
  corpse removal by 867
  landmarks 159
HORN, A. G., *see* LEONARD, M. L.
Horseshoe crabs, *Limulus polyphemus*: male, age-biased stranding and righting 1531
House martins, *Delichon urbica*: paternity defence in 495
HOUSTON, A. I., *see* MOODY, A. L.
HOY, R. R., *see* ADAMO, S. A.
HUEY, R. B., *see* ZAMUDIO, K. R.
HUFFSTADT, A., *see* KOMDEUR, J.
HUGHES, B. O., *see* GRIGOR, P. N.
Hunger and begging in pigeons 601
HURST, J. L. & SMITH, J. *Mus spretus* Lataste: a hygienic house mouse? 827
HURST, J. L., *see* GRAY, S.
Hymenoptera
  Eucoilidae: oviposition decisions 1677
  Braconidae: ovicide in 589
Hyperolius marmoratus: mate choice in 181
Inbreeding in parasitic wasps 1239
Insecta: Zoraptera: courtship feeding and repeated mating 1511
Insemination of damselfly 437

Interference
in bumblebee learning 1481
and ideal free distribution 1065
JAEGER, R. G., SCHWARTZ, J. & WISE S. E. Territorial male salamanders have foraging tactics attractive to gravid females 633
JAEGER, R. G., *see* GABOR, C. R.
Japanese medaka, *Oryzias latipes*
food arrival 1469
sex ratios 367
JENKINS, J. J., *see* ROWLAND, W. J.
JENNIONS, M. D., BACKWELL, P. R. Y. & PASSMORE, N. I. Repeatability of mate choice: the effect of size in the African painted reed frog, *Hyperolius marmoratus* 181
JOHANSSON, A., *see* OTTO, C.
JOHANSSON, K., *see* ROSENQVIST, G.
JOHNSTON, R. E., MUNVER, R. & TUNG, C. Scent counter marks: selective memory for the topscent by golden hamsters 1435
JOHNSTON, R. E., *see* FERKIN, M. H.
JONES, G., *see* DE FANIS, E.
JORGENSON, J. T., *see* L'HEUREUX, N.
JORIS-LAMBERT, S., *see* ETIENNE, A. S.
JOYCE, T. L., *see* STOREY, A. E.
Junco hyemalis: anti-predatory vigilance 11
Kafue lechwe antelope, *Kobus leche kafuensis*: lek-breeding 419
KALAS, J. A., *see* FISKE, P.
Kangaroo rats, *Dipodomys spectabilis*: footdrumming signatures 1227
KEENLEYSIDE, M. H. A., *see* WISENDEN, B. D.
KEMPENAERS, B. Polygyny in the blue tit: intra- and inter-sexual conflicts 1047
KENDRICK, K. M., ATKINS, K., HINTON, M. R., BROAD, K. D., FABRE-NYS, C. & KEVERNE, B. Facial and vocal discrimination in sheep 1665
KEVERNE, B., *see* KENDRICK, K. M.
Kobus leche kafuensis: breeding of 419
KOIVULA, K., *see* RYTKÖNEN, S.
KOMDEUR, J., HUFFSTADT, A., PRAST, W., CASTLE, G., MILETO, R. & WATTEL R. Transfer experiments of Seychelles warblers to new islands: changes in dispersal and helping behaviour .. 695
KRAMER, D. L., *see* WEARY, D. M.
KREUTZER, M., *see* VALLETT, E.
KRISHNAN, V. V., *see* STAMPS, J. A.
Lagopus lagopus: combs on 1249
Lagopus leucurus: male vigilance 1249
Landmarks
hamsters on 165
honey bees on 159
LANFRANCONI-IZAWA, T. L., *see* WISENDEN, B. D.
Larus californicus: offspring growth 641
Larus delawarensis: adoption in 321
Lasiurus borealis: predation by 1461
Lasiurus cinereus: predation by 1461
LAVERY, R. J. Changes in offspring vulnerability account for the increase in convict cichlid defensive behaviour with brood age: evidence for the nest crypsis hypothesis 1171
Leaf beetles, *Oreina* spp.: unpalatability of 709
Learning by bumblebees 1481
Leks
breeding in Kafue lechwe antelope 419
female choice on black grouse 759
LEMON, R. E., *see* MOUNTJOY, D. J.
LENS, L., *see* WAUTERS, L. A.
LEONARD, M. L. & HORN, A. G. Crowing in relation to status in roosters 1283
Leptopilina heterotoma: competition and oviposition decisions 1677
LESSELLS, C. M. Putting resource dynamics into continuous input free distribution models .. 487
L'HEUREUX, N., LUCHERINI, M., FESTA-BIANCHET, M. & JORGENSON, J. T. Density-dependent mother–yearling association in bighorn sheep 901
LIEPA, V., *see* WEINDLER, P.
LIGON, J. D. & ZWARTES, P. W. Female red junglefowl choose to mate with multiple mates .. 127

CONTENTS

LIGON, J. D. & ZWARTES, P. W. Ornate plumage of male red junglefowl does not influence mate choice by females 117
LIMA, S. L. Back to the basics of anti-predatory vigilance: the group-size effect 11
Limulus polyphemus: age-biased stranding and righting 1531
Lions, male, cooperation of 95
Lizards
Anolis aeneus: territorial acquisition in 679
Anolis sagrei: territorial acquisition in 661
Locally adaptive behaviour patterns 1325
Long-tailed macaques, *Macaca fascicularis*: foraging strategies 457
LOSEY, G. S., Jr & SEVENSTER, P. Can three-spined sticklebacks learn when to display? Rewarded displays 137
LOTEM, A., NAKAMURA, H. & ZAHAVI, A. Constraints on egg discrimination and cuckoo–host co-evolution 1185
LOTT, D. F., *see* MAHER, C. R.
LUBIN, Y. Is there division of labour in the social spider *Achaearanea wau* (Theridiidae)? 1315
LUCHERINI, M., *see* L'HEUREUX, N.
LUNDBERG, A.
see HÖGLUND, J.
see RINTAMÄKI, P. T.
Macaca fascicularis: foraging strategies 457
Macaca fuscata: mother–infant relationships 151
Macaca mulatta: mother–infant relationships 1541
Macaques
Macaca fascicularis: long-tailed, foraging strategies 457
Macaca fuscata: Japanese, mother–infant relationships 151
Macaca mulatta: rhesus, mother–infant interaction 1541
MACÍAS GARCIA, C., *see* DRUMMOND, H.
MAESTRIPIERI, D. First steps in the macaque world: do rhesus mothers encourage their infants' independent locomotion? 1541
MAHER, C. R. & LOTT, D. F. Definitions of territoriality used in the study of variation in vertebrate spacing systems 1581
Males
barn swallows, mate guarding of 465
crab spiders, drinking nectar 1443
display, spotted bowerbird 1291
and female melanin pattern in butterflies 45
horseshoe crabs, age-biased stranding and righting 1531
insemination and sperm competition in damselfly 437
lions, cooperation in 95
mate choice in monogamous spiders 715
meadow voles, paternal responsiveness in 1
territoriality, black grouse 759
vigilance, white-tailed ptarmigan 1249
zebra finches, sperm numbers in 451
Malurus cyaneus: territorial defence in female song 1635
MANN, N. I. & SLATER, P. J. B. Song tutor choice by zebra finches in aviaries 811
Marmosets, *Cebuella pygmaea*: female pygmy, ovulatory state 615
MARTIN, K., *see* ARTISS, T.
Mate choice
African painted reed frog 181
black grouse 759
in black grouse 1627
grey partridge 347
Gulf Coast toad 305
in monogamous spiders 715
in pipefish 1039
red junglefowl
multiple mates 127
and plumage 117
ring-necked pheasants 737
spotted bowerbird 1291
in zebra finches 479

Mate guarding
in male barn swallows 465
white-tailed ptarmigan 1249
Mate investment, willow tits 221
Mate sampling, great snipe 209
MATEOS, C. & CARRANZA, J. Female choice for morphological features of male ring-necked pheasants 737
Maternal response in woodrats, to resource limitations 1551
Mates, large, green stink bugs 1335
Mating
between hybridizing species 1389
in Kafue lechwe antelope 419
polygynandrous, of alpine accentor
conflicts 769
and parental effort 789
preference, in guppies 1427
preferences, female field crickets 1269
repeated, and courtship feeding 1511
strategies, white-winged trumpeters 725
success
fruit flies 1303
Japanese medaka 367
MAUCK, R. A. & GRUBB, T. C., Jr Petrel parents shunt all experimentally increased reproductive costs to their offspring 999
MCRAE, S. B. Temporal variation in responses to intraspecific brood parasitism in the moorhen .. 1073
Meadow voles, *Microtus pennsylvanicus*
odour signals 1211
paternal responsiveness in 1
sex recognition in 37
Melanin pattern in butterflies, male choice on 45
Melospiza melodia: song types 1219
MENZEL, C. R., *see* HEMMI, J. M.
Mesocricetus auratus
attack priming and aggressive arousal in 931
and landmarks 165
scent marks 1435
Messor pergandei: joint nesting 567
Metabolic rate in Atlantic salmon 431
METCALFE, N. B., TAYLOR, A. C. & THORPE, J. E. Metabolic rate, social status and life-history strategies in Atlantic salmon 431
Mice
cage cleaning 821
hygienic 827
Microtus pennsylvanicus
odour signals of 1211
scent for sex recognition 37
Migration, pied flycatchers 227
MILETO, R., *see* KOMDEUR, J.
Miliaria calandra: polygyny in 1111
Misumenoides formosipes: drinking nectar 1443
Mole rats, *Spalax ehrenbergi*: chemosensory perception in 1009
MØLLER, A. P., *see* SAINO, N.
Mollusca: Prosobranchia, mating 1389
Molothrus ater
DNA fingerprinting of 1577
egg burial by warblers 877
MONDLOCH, C. J. Chick hunger and begging affect parental allocation of feedings in pigeons .. 601
Monkeys
capuchin, object-choice tasks by 201
red colobus, predation on 577
MOODY, A. L. & HOUSTON, A. I. Interference and the ideal free distribution 1065
Moorhen, *Gallinula chloropus*: brood parasitism in 1073
MORRIS, R. D., *see* BROWN, K. M.
Mother–infant relationships

CONTENTS

gelada baboons 805
Japanese macaques 151
rhesus macaques 1541
Mother–yearling association in bighorn sheep 901
Moths, sex-biased predation on 1461
Mountain goats, *Oreamnos americanus*: social dominance in 1449
MOUNTJOY, D. J. & LEMON, R. E. Extended song learning in wild European starlings 357
Movement in domestic hens, social inhibition of 1381
MUMME, R. L., *see* TERRICK, T. D.
MUÑOZ-PULIDO, R., *see* ALONSO, J. C.
MUNVER, R., *see* JOHNSTON, R. E.
MURPHEY, R. M., PARANHOS DA COSTA, M. J. R., GOMES DA SILVA, R. & DE SOUZA, R. C. Allonursing in river buffalo, *Bubalus bubalis*: nepotism, incompetence, or thievery? 1611
MURPHY, L. B., *see* PETHERICK, J. C.
MURRAY, A.-M., *see* WAGNER, W. E., Jr
Mus musculus: cage cleaning 821
Mus spretus: hygiene of 827
NAKAMURA, H., *see* LOTEM, A.
NEBEL, D.
see DAVIES, N. B.
see HARTLEY, I. R.
Nectar: male crab spiders drinking 1443
NEFDT, R. J. C. Disruptions of matings, harassment and lek-breeding in Kafue lechwe antelope .. 419
Neotoma floridana: resource limitations 1551
Nest switching, white storks 1097
Nesting advantages in desert seed harvester ants 567
NICOLETTO, P. F. Offspring quality and female choice in the guppy, *Poecilia reticulata* 377
Non-nutritive sucking, calves 1503
Non-relatives, help by 389
NOTTEBOHM, F., *see* BARNEA, A.
NOWICKI, S., *see* SEARCY, W. A.
Oceanodroma leucorhoa: reproduction, resources for 999
ODE, P., ANTOLIN, M. F. & STRAND, M. R. Brood-mate avoidance in the parasitic wasp *Bracon hebetor* Say 1239
ODE, P. J., *see* ANTOLIN, M. F.
Odours
female meadow voles 1211
perception in mole rats 1009
role of, pipistrelle bats 835
Offspring
of California gull 641
convict cichlid, defensive behaviour 1171
in guppy 377
petrels, reproductive costs of 999
OLLA, B. L., *see* RYER, C. H.
Oreammos americanus: social dominance in 1449
Oreina cacaliae: defence mechanisms 709
Oreina gloriosa: defence mechanisms 709
ORELL, M., *see* RYTKÖNEN, S.
Oryzias latipes
food arrival 1479
sex ratios 367
Oryziidae
food arrival 1479
sex ratios 367
OTTO, C. & JOHANSSON, A. Why do some caddis larvae in running waters construct heavy, bulky cases? 473
Ovicide: in parasitic wasps 589
Oviposition decisions and competition 1677
Ovis aries: focial and vocal discrimination 1665
Ovis canadensis: mother–yearling association 901
Ovulatory state of female pygmy marmosets 615
PACKER, C., *see* GRINNELL, J.

PAGE, R. E., *see* ROBINSON, G. E.
Pan troglodytes schweinfurthii
predation by 577
PARANHOS DA COSTA, M. J. R., *see* MURPHEY, R. M.
Parasitism
in moorhen nests 1073
in pipefish 1039
in yellow warbler nests 877
Parental effort, alpine accentor 769
Parental food allocation
in cichlids 623
in pigeons 601
PARKER, G. A., *see* CLUTTON-BROCK, T. H.
PARKER, P. G., WAITE, T. A. & DECKER, M. D. Kinship and association in communally roosting black vultures 395
PARKIN, D. T., *see* RILEY, H. T.
PÄRT, T. The importance of local familiarity and search costs for age- and sex-biased philopatry in the collared flycatcher 1029
Parus atricapillus
food storing by 989
loss of cached food 1598
Parus caeruleus: polygyny in 1047
Parus montanus
alarm calling by 221
Concorde fallacy by 1017
PASSERA, L., *see* ARON, S.
PASSMORE, N. I., *see* JENNIONS, M. D.
PASTEELS, J. M., *see* ROWELL-RAHIER, M.
Patch use, cranes, foraging 1367
Paternity
in house martins 495
male meadow voles 1
mating system of alpine accentor 789
red-winged blackbird 21
PENN, D. & BROCKMANN, H. J. Age-biased stranding and righting in male horseshoe crabs, *Limulus polyphemus* 1531
Pentatomidae, large mates 1335
Perception, chemosensory in mole rats 1009
Perdix perdix: mate choice in 347
PETERS, S., *see* SEARCY, W. A.
PETHERICK, J. C., SEAWRIGHT, E., WADDINGTON, D., DUNCAN, I. J. H. & MURPHY, L. B. The role of perception in the causation of dustbathing behaviour in domestic fowl 1521
Petrel, *Oceanodroma leucorhoa*: reproductive costs of 999
PFENNIG, D. W. Absence of joint nesting advantage in desert seed harvester ants: evidence from a field experiment 567
Phasianus colchicus: female choice in 737
Philopatry in collared flycatcher 1029
Physalaemus pustulosus: call analysis system 911
Pied flycatchers, *Ficedula hypoleuca*: migratory orientation in 227
Pieris occidentalis: female melanin pattern 45
Pieris protodice: female melanin pattern 45
Pigeons, feeding in 601
Pipefish, *Syngathus typhle*: mate choice in 1039
Pipistrelle bats, *Pipistrellus pipistrellus*: odour, role of 835
Pipistrellus pipistrellus: odour, role of 835
Pisces: Oryziidae: sex ratios 367
Play, in cheetahs 333
Plethodon cinereus
foraging tactics 633
territories of 71
Plumage and mate choice 117
PODOS, J., *see* SEARCY, W. A.
Poecilia reticulata

mating preference 1427
offspring quality 377
variation in sexual behaviour 1139
Pogonomyrmex barbatus: foraging range 649
POLLARD, S. D., BECK, M. W. & DODSON, G. N. Why do male crab spiders drink nectar? .. 1443
Polygyny
in blue tits 1047
in corn bunting 1111
PORTER, A. H., *see* RIBI, G.
POTEGAL, M. & COOMBES, K. Attack priming and aggressive arousal in female Syrian golden hamsters, *Mesocricetus auratus* 931
PRAST, W., *see* KOMDEUR, J.
Prey & Predation
garter snakes'
coloration of 857
dangerous, discrimination of 891
ideal free distribution 1065
and oviposition decisions 1677
on red colobus monkeys 577
sex-biased, on moths 1461
vigilance for, group-size effect 11
Prosobranchia: mating 1389
Prunella collaris
multiple paternity and parental effort 789
polygynandrous mating system 769
Pseudacris spp.: call evolution 283
Psophia leucoptera: dominance status, mating strategies and copulation success 725
Psophiidae: dominance status and mating strategies 725
Ptarmigan, *Lagopus leucurus*: white-tailed, male vigilance in 1249
PUGESEK, B. H. Offspring growth in the California gull: reproductive effort and parental experience hypotheses 641
PUSEY, A. E., *see* GRINNELL, J.
RAND, A. S., *see* WILCZYNSKI, W.
RANDALL, J. A. Modification of footdrumming signatures by kangaroo rats: changing territories and gaining new neighbours 1227
Rats, *Rattus norvegicus*: food choice 403
Rattus norvegicus: food choice 403
Red colobus monkeys, *Colobus badius tephrosceles*: predation on 577
Red junglefowl, *Gallus gallus*
mate choice by females 117
multiple mates 127
Red squirrels, *Sciurus vulgaris*: territoriality 187
REDONDO, T., TORTOSA, F. S. & DE REYNA, L. A. Nest switching and alloparental care in colonial white storks 1097
Red-winged blackbird, *Agelaius phoeniceus*
paternal behaviour 21
reproductive success 967
REGOLIN, L., VALLORTIGARA, G. & ZANFORLIN, M. Object and spatial representations in detour problems by chicks 195
Reproduction
avian timing 1569
costs, petrels 999
success, red-winged blackbirds 967
Resources
defence and food arrival, Japanese medaka 1469
in free distribution models 487
limitations maternal response to in woodrats 1551
territorial salamanders 71
REVERDIN, B., *see* ETIENNE, A. S.
Rhesus macaques, *Macaca mulata*: mother–infant interaction 1541
RIBI, G. & PORTER, A. H. Mating between two hybridizing species, *Viviparus ater* and *V. contectus* (Mollusca: Prosobranchia) 1389
RIECHERT, S. E. & SINGER, F. D. Investigation of potential male mate choice in a monogamous spider .. 715

RILEY, H. T., BRYANT, D. M., CARTER, R. E. & PARKIN, D. T. Extra-pair fertilizations and paternity defence in house martins, *Delichon urbica* 495
Ring-billed gulls, *Larus delawarensis*: patterns of adoption 321
Ring-necked pheasants, *Phasianus colchicus*: female choice 737
RINTAMÄKI, P. T., ALATALO, R. V., HÖGLUND, J. & LUNDBERG, A. Male territoriality and female choice on black grouse leks 759
River buffalo, *Bubalus bubalis*: allonursing in 1611
ROBINSON, G. E. & PAGE, R. E. Genotypic constraints on plasticity for corpse removal in honey bees colonies 867
RODD, F. H. & SOKOLOWSKI, M. B. Complex origins of variation in the sexual behaviour of male Trinidadian guppies, *Poecilia reticulata*: interactions between social environment, heredity, body size and age 1139
Roosters, *Gallus gallus domesticus*: crowing and status 1283
Roosting by black vultures 395
ROSE, L. M. & FEDIGAN, L. M. Vigilance in white-faced capuchins, *Cebus capucinus*, in Costa Rica.. 63
ROSENQVIST, G. & JOHANSSON, K. Male avoidance of parasitized females explained by direct benefits in a pipefish 1039
ROWELL-RAHIER, M., PASTEELS, J. M., ALONSO-MEJIA, A. & BROWER, L. P. Relative unpalatability of leaf beetles with either biosynthesized or sequestered chemical defence 709
ROWLAND, W. J., BOLYARD, K. J., JENKINS, J. J. & FOWLER, J. Video playback experiments on stickleback mate choice: female motivation and attentiveness to male colour cues .. 1559
RUSHEN, J. & DE PASSILLÉ, A. M. The motivation of non-nutritive sucking in calves, *Bos taurus* .. 1503
RYAN, M. J.
see COCROFT, R. B.
see WILCZYNSKI, W.
RYER, C. H. & OLLA, B. L. Influences of food distribution on fish foraging behaviour 411
RYTKÖNEN, S., ORELL, M. & KOIVULA, K. Pseudo Concorde fallacy in the willow tit? 1017
SAINO, N. & MØLLER, A. P. Testosterone correlates of mate guarding, singing and aggressive behaviour in male barn swallows, *Hirundo rustica* 465
Salamanders, *Plethodon cinereus*
foraging tactics 633
territoriality of 71
SALLABERRY, P., *see* ANDERSON, J. R.
Salmo salar: social status 431
Salmo trutta: and caddis larvae cases 473
Salmon, *Salmo salar*: social status 431
SANTOLAMAZZA-CARBONE, S., *see* CORDERO, A.
Scent
marks, golden hamsters 1435
sex recognition in meadow voles 37
SCHINO, G., D'AMATO, F. R. & TROISI, A. Mother–infant relationships in Japanese macaques: sources of inter-individual variation 151
SCHWARTZ, J., *see* JAEGER, R. G.
Sciurus vulgaris: territorial fidelity and territory shifts 187
SEALY, S. G. Burial of cowbird eggs by parasitized yellow warblers: an empirical and experimental study 877
SEARCY, W. A., PODOS, J., PETERS, S. & NOWICKI, S. Discrimination of song types and variants in song sparrows 1219
SEAWRIGHT, E., *see* PETHERICK, J. C.
Serinus canaria: songs, responsiveness to 1603
SEVENSTER, P., *see* LOSEY, G. S., Jr
Sex ratios
in fire ants.. 749
in Japanese medaka 367
in parasitic wasps 589
Sex recognition, meadow voles 37
Sexual behaviour, Trinidadian guppies 1139
Sexual coercion in animal societies 1345
Sexual selection, Gulf Coast toad.. 305
Seychelles warblers, *Acrocephalus sechellensis*: transfer experiments 695
Sheep, *Ovis aries*: facial and vocal discrimination in.. 1665
SHEPHERD, M., *see* HARTLEY, I. R.
SHERMAN, P. T., *see* EASON, P. K.

CONTENTS

SHETTLEWORTH, S. J., HAMPTON, R. R. & WESTWOOD, R. P. Effects of season and photoperiod on food storing by black-capped chickadees, *Parus atricapillus* 989
Shuttling, desert antelope ground squirrels 107
SIKES, R. S. Maternal response to resource limitations in eastern woodrats 1551
Silo pallipes: larvae cases 473
SINGER, F. D., *see* RIECHERT, S. E.
SKEER, J., *see* DAVIES, N. B.
SLATER, P. J. B., *see* MANN, N. I.
SMITH, J., *see* HURST, J. L.
Snails, *Viviparus* spp.: mating, hybridizing species 1389
SNOWDON, C. T., *see* CONVERSE, L. J.
Social dominance in mountain goats 1449
Social spider, division of labour 1315
Social status in Atlantic salmon 431
SOKOLOWSKI, M. B., *see* RODD, F. H.
Solenopsis invicta: sex ratios 749
Song sparrows, *Melospiza melodia*: song types 1219
Songs
  learning
    European starlings 357
    zebra finches 811
  responsiveness of female canaries 1603
  in song sparrows 1219
  and territorial defence in superb fairy-wren 1635
SOOS, C. E., *see* GRANT, J. W. A.
Spalax ehrenbergi: chemosensory perception 1009
Sperm
  competition, in damselfly 437
  numbers in male zebra finches 451
Spiders
  mate choice in 715
  social, division of labour 1315
Spizella arborea: anti-predatory vigilance 11
Spotted bowerbird, *Chlamydera maculata*: male display and female choice 1291
STAMPS, J. A. & KRISHNAN, V. V. Territory acquisition in lizards: III. Competing for space .. 679
STANFORD, C. B. The influence of chimpanzee predation on group size and anti-predator behaviour in red colobus monkeys 577
Starlings
  European, song learning 357
  foraging decisions of 1617
Sticklebacks, three-spined, *Gasterosteus aculeatus*
  mate choice 1559
  rewarded displays 137
Stink bugs, *Acrosternum, hilare*: green, large mates, preference for 1335
STOREY, A. E. & JOYCE, T. L. Pup contact promotes paternal responsiveness in male meadow voles 1
STRAND, M. R.
  see ANTOLIN, M. F.
  see ODE, P.
Stranding and righting in male horseshoe crabs 1531
Sturnus vulgaris
  foraging decisions 1617
  song learning 357
SULLIVAN, B. K., *see* WAGNER, W. E.
Superb fairy-wren, *Malurus cyaneus*: territorial defence 1635
SVENSSON, E. Avian reproductive timing: when should parents be prudent? 1569
Syngnathus typhle: mate choice in 1039
Syrian golden hamsters, attack priming 931
Taeniopygia guttata
  female choice 479
  song learning 811
  sperm numbers 451
Tamias striatus: alarm calls 81

TAYLOR, A. C., *see* METCALFE, N. B.
Temperature and shuttling: desert antelope ground squirrels 107
TEMPLETON, J. J. & GIRALDEAU, L.-A. Public information cues affect the scrounging decisions of starlings 1617
TERRICK, T. D., MUMME, R. L. & BURGHARDT, G. M. Aposematic coloration enhances chemosensory recognition of noxious prey in the garter snake *Thamnophis radix* 857
Territoriality
black grouse males 759
definitions of 1581
female red squirrels 187
and female song of superb fairy-wren 1635
of fruit flies 671
kangaroo rats 1227
male lizards 661
male salamanders 633
of salamanders 71
Territory acquisition in lizards 679
Testosterone and mate guarding, male barn swallows 465
Tetrao tetrix
mate choice copying 1627
mate choice in 759
Thamnophis eques: prey discrimination 891
Thamnophis melanogaster: prey discrimination 891
Thamnophis radix: coloration of prey 857
Theragra chalcogramma: foraging behaviour 411
Theridiidae, division of labour 1315
Theropithecus gelada: mother–infant contact 805
THORPE, J. E., *see* METCALFE, N. B.
Three-spined sticklebacks, *see* Sticklebacks
Toads, *Pseudacris* spp.: advertisement call evolution 283
TODRANK, J., *see* HETH, G.
TOKARZ, R. R. Importance of androgens in male territorial acquisition in the lizard *Anolis sagrei*: an experimental test 661
TORTOSA, F. S., *see* REDONDO, T.
Trachemys scripta: water-finding by 977
Transfer in bumblebee learning 1481
Trinidadian guppies: sexual behaviour of 1139
TROISI, A., *see* SCHINO, G.
Trumpeter, white-winged, *Psophia leucoptera*: dominance status 725
TUNG, C., *see* JOHNSTON, R. E.
Túngara frog, *Physalaemus pustulosus*: call analysis system of 911
Turtles, *Trachemys scripta*: water-finding in 977
TYLER, W. A., III The adaptive significance of colonial nesting in a coral-reef fish 949
UTZERI, C., *see* CORDERO, A.
VALLETT, E. & KREUTZER, M. Female canaries are sexually responsive to special song phrases .. 1603
VALLORTIGARA, G., *see* REGOLIN, L.
VARGO, E. L., *see* ARON, S.
Vertebrate spacing systems and territoriality 1581
Vigilance
anti-predatory, group-size effect 11
males, white-tailed ptarmigan 1249
sustained, and animal performance 1259
in white-faced capuchins 63
VISALBERGHI, E. & FRAGASZY, D. The behaviour of capuchin monkeys, *Cebus apella*, with novel food: the role of social context 1089
VISSER, M. E. The effect of competition on oviposition decisions of *Leptopilina heterotoma* (Hymenoptera: Eucoilidae) 1677
Viviparus ater: mating between hybridizing species 1389
Viviparus contectus: mating between hybridizing species 1389
Vocal discrimination in sheep 1665
Vultures, *Coragyps atratus*: black, communally roosting 395
WADDINGTON, D., *see* PETHERICK, J. C.
WAGNER, W. E. & SULLIVAN, B. K. Sexual selection in the Gulf Coast toad, *Bufo valliceps*: female choice based on variable characters 305

CONTENTS

WAGNER, W. E., Jr, MURRAY, A.-M. & CADE, W. H. Phenotypic variation in the mating preferences of female field crickets, *Gryllus integer* 1269
WAITE, T. A., *see* PARKER, P. G.
Warblers
Acrocephalus arundinaceus: cuckoo egg discrimination 1185
Acrocephalus sechellensis: transfer experiments 695
Wasps, *Bracon hebetor*
brood-mate avoidance 1239
ovicide in 589
Water-finding in turtles 977
WATTEL R., *see* KOMDEUR, J.
WAUTERS, L. A., LENS, L. & DHONDT, A. A. Variation in territorial fidelity and territority shifts among red squirrels, *Sciurus vulgaris*, females 187
WEARY, D. M. & KRAMER, D. L. Response of eastern chipmunks to conspecific alarm calls .. 81
WEATHERHEAD, P. J. Effects on female reproductive success of familiarity and experience among male red-winged blackbirds 967
WEINDLER, P., BECK, W., LIEPA, V. & WILTSCHKO, W. Development of migratory orientation in pied flycatchers in different magnetic inclinations 227
WESTNEAT, D. F. Paternity and paternal behaviour in the red-winged blackbird, *Agelaius phoeniceus*.. 21
WESTWOOD, R. P., *see* SHETTLEWORTH, S. J.
White storks, *Ciconia ciconia*: nest switching 1097
White-tailed ptarmigan, *Lagopus leucurus*: male vigilance in 1249
White-winged trumpeters, *Psophia leucoptera*: dominance status in 725
WIERNASZ, D. C. Male choice on the basis of female melanin pattern in *Pieris* butterflies.. .. 45
WILCZYNSKI, W., RAND, A. S. & RYAN, M. J. The processing of spectral cues by the call analysis system of the túngara frog, *Physalaemus pustulosus* 911
Willow ptarmigan, *Lagopus lagopus*: colour bands, combs and coverable badges in 53
Willow tits, *Parus montanus*
alarm calling 221
pseudo Concorde fallacy in 1017
WILTSCHKO, W., *see* WEINDLER, P.
WISE S. E., *see* JAEGER, R. G.
WISENDEN, B. D., LANFRANCONI-IZAWA, T. L. & KEENLEYSIDE, M. H. A. Fin digging and leaf lifting by the convict cichlid, *Cichlasoma nigrofasciatum*: examples of parental food provisioning .. 623
Woodrats, *Neotoma floridana*: maternal response to resource limitations 1551
WOULFE, M., *see* BROWN, K. M.
WRIGHT, T. J., *see* GALEF, B. G., Jr
Yellow warblers, *Dendroica petechia*: burial of cowbird eggs by 877
YEOMANS, S. R. Water-finding in adult turtles: random search or oriented behaviour? 977
ZAHAVI, A., *see* LOTEM, A.
ZAMUDIO, K. R., HUEY, R. B. & CRILL W. D. Bigger isn't always better: body size, developmental and parental temperature and male territorial success in *Drosophila melanogaster* 671
ZANFORLIN, M., *see* REGOLIN, L.
Zebra finches, *Taeniopygia guttata*
female choice in 479
song tutor choice 811
sperm numbers in 451
ZIEGLER, T. E., *see* CONVERSE, L. J.
Zoraptera: courtship feeding and repeated mating 1511
Zorotypus barberi
courtship feeding and repeated mating 1511
ZWARTES, P. W., *see* LIGON, J. D.
Zygoptera: Coenagrionidae: repeated insemination and sperm competition 437

Commentaries

ALLEN, C. Anatomy dissected 841
Allogrooming, impala 528
Anatomy dissected 841
Birds
extra-pair copulation and paternity in 843
paternity and paternal care 522

BIRKHEAD, T. R. & MØLLER, A. P. Extra-pair copulation and extra-pair paternity in birds .. 843
BIRKHEAD, T. R., *see* MØLLER, A. P.
CHANDLER, C. R. Practical considerations in the use of simultaneous inference for multiple tests .. 524
CONNOR, R. C. Impala allogrooming and the parcelling model of reciprocity 528
Copulation and paternity in birds 843
CUTHILL, I. C., *see* SWADDLE, J. P.
DALE, J. Problems with pair-wise comparisons: does certainty of paternity covary with paternal care? 519
Fluctuating asymmetry
museum studies on 1700
sampling bias and 1697
FREY, D. F. & LEONG, K. L. H. Reply to Nylin, Wickman & Wiklund regarding sex ratios of overwintering monarch butterflies 515
Impala, *Aepyceros melampus*: allogrooming 528
LEONG, K. L. H., *see* FREY, D. F.
MANNING, J. T., *see* SIMMONS, L. W.
MØLLER, A. P. & BIRKHEAD, T. R. Certainty of paternity covary with paternal care in birds: a reply to Dale 522
MØLLER, A. P., *see* BIRKHEAD, T. R.
Monarch butterflies, *Danaus plexippus*
overwintering, male-biased sex ratios in 511
reply to 515
Museum studies measure FA 1700
NYLIN, S., WICKMAN, P.-O. & WIKLUND, C. An adaptive explanation for male-biased sex ratios in overwintering monarch butterflies 511
Oestrous advertisement
and sexual selection 1401
spite and sexual harassment 1399
PAGEL, M. Sexual selection and oestrous advertisement: a reply to Radwan 1401
Paternity
and paternal care 519
in birds 522
extra-pair copulation and 843
RADWAN, J. On oestrous advertisement, spite and sexual harassment 1399
Sex ratios, overwintering monarch butterflies 511
Sexual harassment and oestrous advertisement 1399
Sexual selection and oestrous advertisement 1401
SIMMONS, L. W., TOMKINS, J. L. & MANNING, J. T. Sampling bias and fluctuating asymmetry .. 1697
Simultaneous inference for multiple tests 524
SWADDLE, J. P., WITTER, M. S. & CUTHILL, I. C. Museum studies measure FA 1700
TOMKINS, J. L., *see* SIMMONS, L. W.
WICKMAN, P.-O., *see* NYLIN, S.
WIKLUND, C., *see* NYLIN, S.
WITTER, M. S., *see* SWADDLE, J. P.

Short Communications

Acheta domesticus: locomotion and grooming in 531
Aepyceros melampus: costs of allogrooming 1414
Allogrooming, impala, costs of 1414
ALMADA, V. C., GONÇALVES, E. J., OLIVEIRA, R. F. & SANTOS, A. J. Courting females: ecological constraints affect sex roles in a natural population of the blenniid fish *Salaria pavo* .. 1125
Animal numbers and resources 248
Apis mellifera: and nestmates' ovaries 542
Argiope aemula: sexual cannibalism in 1119
ASHTON, M. C., *see* HOGAN-WARBURG, A. J.
Beetles, *Plagiodera versicolora*: cannibalism in 545
BERCOVITCH, F. B., HAUSER, M. D. & JONES, J. H. The endocrine stress response and strain vocalizations in rhesus macaques 1703
Blenniid fish, *Salaria pavo*: sex roles in natural population 1125
Blue monkeys, *Cercopithecus mitis*: territoriality 240
BRAITHWAITE, V. A. & GUILFORD, T. A loft with a view: exposure to a natural landscape during development may encourage adult pigeons to use visual landmarks during homing .. 252
BRICK, O., *see* JAKOBSSON, S.

CONTENTS

BRODIE, E. D., III & MOORE, A. J. Experimental studies of coral snake mimicry: do snakes mimic millipedes? 534
Cannibalism
and relatedness in beetles 545
sexual in orb-weaving spider 1119
CARRANZA, J., GARCIA-MUÑOZ, A. J. & DE DIOS VARGAS, J. Experimental shifting from harem defence to territoriality in rutting red deer 551
Cercocebus torquatus: sire's tolerance of offspring 1403
Cercopithecus mitis: territoriality 240
Cervus elaphus: harem defence and territoriality 551
CHAPPELL, M. A., ZUK, M., KWAN, T. H. & JOHNSEN, T. S. Energy cost of an avian vocal display: crowing in red junglefowl 255
CIGLIANO, J. A. Assessment of the mating history of female pygmy octopuses and a possible sperm competition mechanism 849
COLLIER, G., *see* JOHNSON, D. F.
Columba livia: natural landscape and homing 252
Competition
locomotion and grooming in crickets 531
and prey load size, European starling 261
Coral snakes, *Micurus*: mimicry 534
Crickets, *Acheta domesticus*: locomotion and grooming in 531
Crowing in red junglefowl 255
Daily greetings and pair bonds in seahorses 258
Damselfish, *Stegastes planifrons*: territorial defence costs in 1406
DE DIOS VARGAS, J., *see* CARRANZA, J.
DENAULT, L. K. & MCFARLANE, D. A. Reciprocal altruism between male vampire bats, *Desmodus rotundus* 855
Desmodus rotundus: reciprocal altruism in 855
DILL, L. M., *see* POCKLINGTON, R.
Distance call learning and song in zebra finches 548
DUKAS, R., *see* VISSCHER, P. K.
Electric fish, *Hypopomus occidentalis*: electric organ discharges of 1409
European bee-eaters, *Merops apiaster*: provisioning calls of 244
European starling, *Sturnus vulgaris*: intraspecific competition on prey load size 261
Feeding hierarchies in naked mole-rat colonies 537
Females
courting, blenniid fish 1125
pygmy octopuses 849
Fighting behaviour, escalated 235
Gallus gallus: crowing in 255
GARCIA-MUÑOZ, A. J., *see* CARRANZA, J.
GERIGITS, T. P., *see* GUST, D. A.
GOFF, P. W. & STEVENS, L. A test of Hamilton's rule: cannibalism and relatedness in beetles .. 545
GONÇALVES, E. J., *see* ALMADA, V. C.
GORDON, T. P., *see* GUST, D. A.
Grooming and locomotion in crickets 531
GUILFORD, T., *see* BRAITHWAITE, V. A.
GUST, D. A., GORDON, T. P. & GERIGITS, T. P. Proximity at birth relates to a sire's tolerance of his offspring among sooty mangabeys 1403
HAGEDORN, M. The electric fish *Hypopomus occidentalis* can rapidly modulate the amplitude and duration of its electric organ discharges 1409
Harem defence and territoriality in rutting red deer 551
HART, B. L., *see* MOORING, M. S.
HAUSER, M. D., *see* BERCOVITCH, F. B.
HEINZ, S. P., *see* LAWES, M.
Hippocampus spp.: pair bonds, daily greetings 258
HOGAN, J. A., *see* HOGAN-WARBURG, A. J.
HOGAN-WARBURG, A. J., HOGAN, J. A. & ASHTON, M. C. Locomotion and grooming in crickets: competition or time sharing? 531
Homing and natural landscapes in adult pigeons 252
Honey bees, *Apis mellifera*: and nestmates' ovaries 542
HOUSTON, A. I., MCNAMARA, J. M. & MILINSKI, M. The distribution of animals between resources: a compromise between equal numbers and equal intake rates 248

Hypopomus occidentalis: electric organ discharges of 1409
Impala, *Aepyceros melampus*: costs of allogrooming 1414
IWAHASHI, O., *see* SASAKI, T.
JAKOBSSON, S., BRICK, O. & KULLBERG, C. Escalated fighting behaviour incurs increased predation risk 235
JOHNSEN, T. S., *see* CHAPPELL, M. A.
JOHNSON, D. F., TRIBLEHORN, J. & COLLIER, G. Rats' meal-ending rules in depleting patches .. 1707
JONES, A. E., *see* SLATER, P. J. B.
JONES J. H., *see* BERCOVITCH, F. B.
KOIVULA, K., *see* WELLING, P.
KULLBERG, C., *see* JAKOBSSON, S.
KWAN, T. H., *see* CHAPPELL, M. A.
LAWES, M. & HEINZ, S. P. Inter-group encounters in blue monkeys: how territorial must a territorial species be? 240
LESSELLS, C. M., ROWE, C. L. & MCGREGOR, P. K. Individual and sex differences in the provisioning calls of European bee-eaters 244
Macaca mulatta: endocrine stress response and strain vocalizations 1703
Males
and predation 1122
reciprocal altruism in vampire bats 855
tolerance of offspring among sooty mangabeys 1403
Mates and mating
in female pygmy octopuses 849
guarding in willow tit 852
MCGREGOR, P. K., *see* LESSELLS, C. M.
MCNAMARA, J. M., *see* HOUSTON, A. I.
MEADOWS, D. Effects of habitat geometry on territorial defence costs in a damselfish 1406
Meal-ending rules of rats 1707
Merops apiaster: provisioning calls of 244
Micurus: mimicry 534
MILINSKI, M., *see* HOUSTON, A. I.
Mole-rat, *Heterocephalus glaber*: colonies, feeding hierarchies 537
MOORE, A. J., *see* BRODIE, E. D., III
MOORING, M. S. & HART, B. L. Costs of allogrooming in impala: distraction from vigilance .. 1414
Octopus: female pygmy, mating history of 849
OLIVEIRA, R. F., *see* ALMADA, V. C.
Ovaries, nestmates', in honey bees 542
Pair bonds in seahorses, and daily greetings 258
Parus montanus: mate guarding 852
Pigeons, *Columba livia*: natural landscape and homing 252
Plagiodera versicolora: cannibalism in 545
POCKLINGTON, R. & DILL, L. M. Predation on females or males: who pays for bright male traits? .. 1122
Predation
and bright male traits 1122
risk, increased 235
Prey load size, European starling, intraspecific competition on 261
Provisioning calls of European bee-eaters 244
Pygmy octopuses, *Octopus*: female, mating history of 849
Rats, meal-ending rules 1707
Reciprocal altruism in male vampire bats 855
Red deer, *Cervus elaphus*: harem defence and territoriality 551
Red junglefowl, *Gallus gallus*: crowing in 255
Resources, distribution of 248
Rhesus macaques, *Macaca mulatta*: endocrine stress response and strain vocalizations 1703
ROWE, C. L., *see* LESSELLS, C. M.
RYTKÖNEN, S., *see* WELLING, P.
Salaria pavo: ecological constraints on sex roles 1125
SANTOS, A. J., *see* ALMADA, V. C.
SASAKI, T. & IWAHASHI, O. Sexual cannibalism in an orb-weaving spider *Argiope aemula* 1119
SCHIEFFELIN, J. S. & SHERMAN, P. W. Tugging contests reveal feeding hierarchies in naked mole-rat colonies 537
Seahorses, *Hippocampus* spp.: pair bonds, daily greetings 258
Sex differences, bee-eaters, provisioning calls 244

CONTENTS

Sex roles of blenniid fish 1125
Sexual cannibalism in orb-weaving spider 1119
SHERMAN, P. W., *see* SCHIEFFELIN, J. S.
SLATER, P. J. B. & JONES, A. E. The timing of song and distance call learning in zebra finches .. 548
Snakes, mimicking millipedes 534
Song of zebra finches 548
Sooty mangabeys, *Cercocebus torquatus*: sire's tolerance of offspring 1403
Sperm, competition mechanism in female pygmy octopuses 849
Spider, *Argiope aemula*: orb-weaving, sexual cannibalism in 1119
Stegastes planifrons: territorial defence costs in 1406
STEVENS, L., *see* GOFF, P. W.
Sturnus vulgaris: and prey load size 261
Taeniopygia guttata: song and distance call learning 548
Territoriality
of blue monkeys 240
and defence costs in damselfish 1406
in rutting red deer 551
Time sharing, locomotion and grooming in crickets 531
TRIBLEHORN, J., *see* JOHNSON, D. F.
Tugging contests and feeding hierarchies in naked mole-rat colonies 537
Vampire bats, *Desmodus rotundus*: reciprocal altruism 855
VINCENT, A. C. J. A role for daily greetings in maintaining seahorse pair bonds 258
VISSCHER, P. K. & DUKAS, R. Honey bees recognize development of nestmates' ovaries 542
WELLING, P., KOIVULA, K. & RYTKÖNEN, S. Differences in mate guarding between age classes in the willow tit, *Parus montanus* 852
Willow tit, *Parus montanus*: mate guarding in 852
WITTER, M. S. The effect of intraspecific competition on prey load size in the European starling, *Sturnus vulgaris* 261
Zebra finches, *Taeniopygia guttata*: song and distance call learning 548
ZUK, M., *see* CHAPPELL, M. A.

Book Reviews

ALCOCK, J. Animal Behaviour. 5th edn 1130
BILDSTEIN, K. L. White Ibis: Wetland Wanderer 269
BRADSHAW, J. W. S. The Behaviour of the Domestic Cat 563
BURNS, J., MONTAGUE, J. & COWLES, C. J. The Bowhead Whale 558
CRONIN, H. The Ant and the Peacock: Altruism and Sexual Selection from Darwin to Today .. 564
DAVIES, M. N. O. & GREEN, P. R. Perception and Motor Control in Birds 566
DICKENS, D. & CLARK, R. Videolabs in Behavioural Observation, Volume 1. Focusing In .. 265
DRICKAMER, L. C. & VESSEY, S. H. Animal Behaviour: Mechanisms, Ecology and Evolution. 3rd edn 1130
DUELLMAN, W. E. & TRUEB, L. B. Biology of Amphibians 1129
GIBBONS, E. F., WYERS, E. J., WATERS, E. & MENZEL, E. W. Naturalistic Environments in Captivity for Animal Behaviour Research 555
GODFRAY, H. C. J. Parasitoids. Behavioural and Evolutionary Ecology 561
GRIFFIN, D. R. Animal Minds 1133
HAYSSEN, V., VAN TIENHOVEN, A. & VAN TIENHOVEN, A. Adsell's Patterns of Mammalian Reproduction 266
JABLONSKI, N. G. Theropithecus: the Rise and Fall of a Primate Genus 557
KAPPELER, P. M. & GANZHORN, U. Lemur Social Systems and Their Ecological Basis 1417
LAWS, R. M. Antarctic Seals: Research Methods and Techniques 1422
LEVER, C. Naturalized Animals: The Ecology of Successfully Introduced Species 1418
MCFARLAND, D. & BÖSSER, T. Intelligent Behaviour in Animals and Robots 562
MILLER, B. D. Sex and Gender Hierarchies 555
MØLLER, A. P. Sexual Selection and the Barn Swallow 1420
PITCHER, T. J. Behaviour of Teleost Fishes 267
PRESTON-MAFHAM, R. & PRESTON-MAFHAM, K. The Encyclopedia of Land Invertebrate Behaviour .. 268
RUSHTON, J. P. Race, Evolution, and Behavior 1133
RYLANDS, A. B. Marmosets and Tamarins. Systematics, Behaviour and Ecology 560
SMALL, M. F. Female Choices: Sexual Behaviour of Female Primates 271
SPINAGE, C. Elephants 1421

STOUDER, D. J., FRESH, K. L. & FELLER, R. J. Theory and Application in Fish Feeding Ecology .. 1418
VITT, L. J. & PIANKA, E. R. Lizard Ecology. Historical and Experimental Perspectives 1129
YOUNG, E. Skua and Penguin. Predator and Prey 270